

Effect of above-ground restoration on native and exotic earthworm communities

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New Zealand has more than 200 endemic earthworm species described and many putative new species yet to be described. In addition to those, European earthworms have been introduced to pastures and other agricultural land to increase primary production in the 1960s. Twenty three exotic species are currently present in New Zealand but half a dozen of these have significant distribution in agricultural land and pastures. It has been reported that endemic earthworm communities disappeared quickly after the introduction of exotic grassland and crops mainly because of environmental changes. However, little is known potential competition between endemic and exotic earthworms in New Zealand, and the capacity of exotic earthworm to also colonise soils under native habitats.

The aim of this study was to estimate the impact of habitat modification, namely plant species composition, on endemic earthworm communities and determine whether the restoration of native habitat leads to recolonisation by endemic earthworm communities.

If habitat modification is the major factor leading to endemic earthworm disappearance, then restoration of native habitat may be sufficient to restore endemic earthworm communities. We tested this hypothesis in two sites in New Zealand, Quail Island, which has been undergoing plant restoration for more than 30 years, and the Punakaiki Coastal Reserve where 150,000 trees have been replanted in the last seven years. Both in Punakaiki and Quail Island, sequential restoration plantings revealed that recolonisation by endemic earthworms increases with time after restoration. Our results also indicated that the proportions of endemic versus exotic earthworm (based on either abundance or biomass) were the best indicators of restoration age in comparison to raw abundance or biomass of endemic or exotic earthworms. However exotic species did not disappear after restoration of native vegetation, even after 30 years, leading to the cohabitation of the two communities and potential for interspecific competition.